

ABSTRACT

A semiconductor-on-insulator (SOI) device includes a thermoelectric cooler on a back side of the device. The thermoelectric cooler is formed on a thinned portion of a deep bulk semiconductor layer of the SOI device. The thermoelectric device includes a plurality of pairs of opposite conductivity semiconductor material blocks formed on a metal layer deposited on the thinned portion. The thinning of the thinned portion may be accomplished in multiple etching steps of the deep silicon layer, such as a fast etching down to an etch stop and a slower, more controlled etch to the desired thickness for the thinned portion.